CLAIMS

What is claimed is:

1. A flash memory controller comprising:

a processor for performing at least one operation; and

arbitration logic coupled to the processor, wherein data from the arbitration logic allows the processor to perform the at least one operation for a flash memory device.

2. The flash memory controller of claim 1 wherein the flash memory device comprises a plurality of flash memory devices.

3. The flash memory controller of claim 2 wherein the plurality of flash memory devices can comprise flash memory devices having different capacities.

4. The flash memory controller of claim 2 wherein the at least one operation can be performed simultaneously on different flash memory devices of the flash memory system.

5. The flash memory controller of claim 1 wherein the processor can utilize data from the arbitration logic to conduct a search for available blocks, wherein the search is directed to the flash memory device.

6. The flash memory controller of claim 1 further comprising an internal buffer within the flash memory device, wherein the internal buffer stores valid data during a search for available blocks.

7. The flash memory controller of claim 1 wherein the operation comprises at least one block management operation.

8. The flash memory controller of claim 7 wherein the at least one block management operation comprises one of handling bad blocks, recycling obsolete blocks, and wear leveling.

9. The flash memory controller of claim 1 wherein the flash memory controller can be applied to USB Flash Drive, Secure Digital Card, MultiMediaCard, Memory Stick, Compact Flash Card, Flash Memory Hard Drive, and ExpressCard.

10. The flash memory controller of claim 1 wherein the flash memory controller can be applied to multi-mode USB, Secure Digital (SD), MultiMediaCard (MMC), Memory Stick (MS), and Compact Flash (CF) card.

11. The flash memory controller of claim 1 wherein the flash memory controller provides multiple-block data access.

12. The flash memory controller of claim 1 wherein the flash memory controller provides dual channel processing.

13. The flash memory controller of claim 1 wherein the flash memory controller can perform multiple banks interleave.

14. The flash memory controller of claim 1 wherein the flash memory controller can perform functions of multiple block access, multiple bank interleaving, and multiple channel operations in a memory access cycle.

15. A flash memory system comprising:

a first processor;

a device interface coupled to the processor; and

a flash memory controller coupled to the device interface, the flash memory controller comprising:

a second processor for executing at least one operation; and

arbitration logic coupled to the processor, wherein data from the arbitration logic allows the processor to perform the at least one operation for a flash memory device.

16. The flash memory controller of claim 15 wherein the flash memory device comprises a plurality of flash memory devices.

17. The system of claim 16 wherein the plurality of flash memory devices can comprise flash memory devices having different capacities.

18. The system of claim 16 wherein the at least one operation can be performed simultaneously on different flash memory devices of the flash memory system.

19. The system of claim 15 wherein the second processor can utilize data from the arbitration logic to conduct a search for available blocks, wherein the search is directed to the particular flash memory device.

20. The system of claim 15 further comprising an internal buffer within the particular flash memory device, wherein the internal buffer stores valid data during a search for available blocks.

21. The system of claim 15 wherein the operation comprises at least one block management operation.

22. The system of claim 21 wherein the at least one block management operation comprises one of handling bad blocks, recycling obsolete blocks, and wear leveling.

23. The system of claim 15 wherein the flash memory controller can be applied to USB Flash Drive, Secure Digital Card, MultiMediaCard, Memory Stick, Compact Flash Card, Flash Memory Hard Drive, and ExpressCard.

24. The system of claim 15 wherein the flash memory controller can be applied to multi-mode USB, Secure Digital (SD), MultiMediaCard (MMC), Memory Stick (MS), and Compact Flash (CF) card.

25. The system of claim 15 wherein the flash memory controller provides multiple-block data access.

26. The system of claim 15 wherein the flash memory controller provides dual channel processing.

27. The system of claim 15 wherein the flash memory controller can interleave multiple blocks.

28. The system of claim 15 wherein the flash memory controller can perform functions of multiple block access, multiple bank interleaving, and multiple channel operations in a memory access cycle.

29. A method for managing flash memory in a flash memory system, the method comprising:

(a) initiating at least one operation;

(b) conducting a search for a destination block within a flash memory device; and

(c) relocating valid data within the flash memory device from a source block to the destination block, wherein the at least one operation is performed for the flash memory device.

30. The method of claim 29 wherein the flash memory device comprises a plurality of flash memory devices.

31. The method of claim 30 wherein the plurality of flash memory devices can include flash memory devices having different capacities.

32. The method of claim 30 wherein the at least one operation can be performed simultaneously on different flash memory devices of the flash memory system.

33. The method of claim 29 wherein arbitration logic provides data to a processor to direct the search to the flash memory device.

34. The method of claim 29 wherein the conducting a search step (b) further comprises (b2) storing the valid data in an internal buffer during the search.

35. The method of claim 29 wherein the at least one operation includes at least one block management operation.

36. The method of claim 35 wherein the at least one block management operation includes one of handling bad blocks, recycling obsolete blocks, and wear leveling.

37. The method of claim 29 wherein the method can be applied to USB Flash Drive, Secure Digital Card, MultiMediaCard, Memory Stick, Compact Flash Card, Flash Memory Hard Drive, and ExpressCard.

38. The method of claim 29 wherein the method can be applied to multi-mode USB, Secure Digital (SD), MultiMediaCard (MMC), Memory Stick (MS), and Compact Flash (CF) card.

39. The method of claim 29 wherein the flash memory controller provides multiple-block data access.

40. The method of claim 29 wherein the flash memory controller provides dual channel processing.

41. The method of claim 29 wherein the flash memory controller can interleave multiple blocks.

42. The method of claim 29 wherein the flash memory controller can perform functions of multiple block access, multiple bank interleaving, and multiple channel operations in a memory access cycle.

43. A computer readable medium containing program instructions for managing flash memory, the program instructions which when performed by a computer system cause the computer system to perform a method comprising:

(a) initiating at least one operation;

(b) conducting a search for a destination block within a flash memory device; and

(c) relocating valid data within the flash memory device from a source block to the destination block, wherein the at least one operation is performed for a flash memory device.

44. The computer readable medium of claim 43 wherein the flash memory device comprises a plurality of flash memory devices.

45. The computer readable medium of claim 44 wherein the plurality of flash memory devices can include flash memory devices having different capacities.

46. The computer readable medium of claim 44 wherein the at least one operation can be performed simultaneously on different flash memory devices of the flash memory system.

47. The computer readable medium of claim 43 wherein arbitration logic provides data to a processor to direct the search to the flash memory device.

48. The computer readable medium of claim 43 wherein the conducting step (b) further comprises comprising program instructions for (b2) storing the valid data in an internal buffer during the search.

49. The computer readable medium of claim 43 wherein the at least one operation includes at least one block management operation.

50. The computer readable medium of claim 49 wherein the at least one block management operation includes one of handling bad blocks, recycling obsolete blocks, and wear leveling.

51. The computer readable medium of claim 43 wherein the computer readable medium can be applied to USB Flash Drive, Secure Digital Card, MultiMediaCard, Memory Stick, Compact Flash Card, Flash Memory Hard Drive, and ExpressCard.

52. The computer readable medium of claim 43 wherein the computer readable medium can be applied to multi-mode USB, Secure Digital (SD), MultiMediaCard (MMC), Memory Stick (MS), and Compact Flash (CF) card.

53. The computer readable medium of claim 43 wherein the flash memory controller provides multiple-block data access.

54. The computer readable medium of claim 43 wherein the flash memory controller provides dual channel processing.

55. The computer readable medium of claim 43 wherein the flash memory controller can interleave multiple blocks.

56. The computer readable medium of claim 43 wherein the flash memory controller can perform functions of multiple block access, multiple bank interleaving, and multiple channel operations in a memory access cycle.